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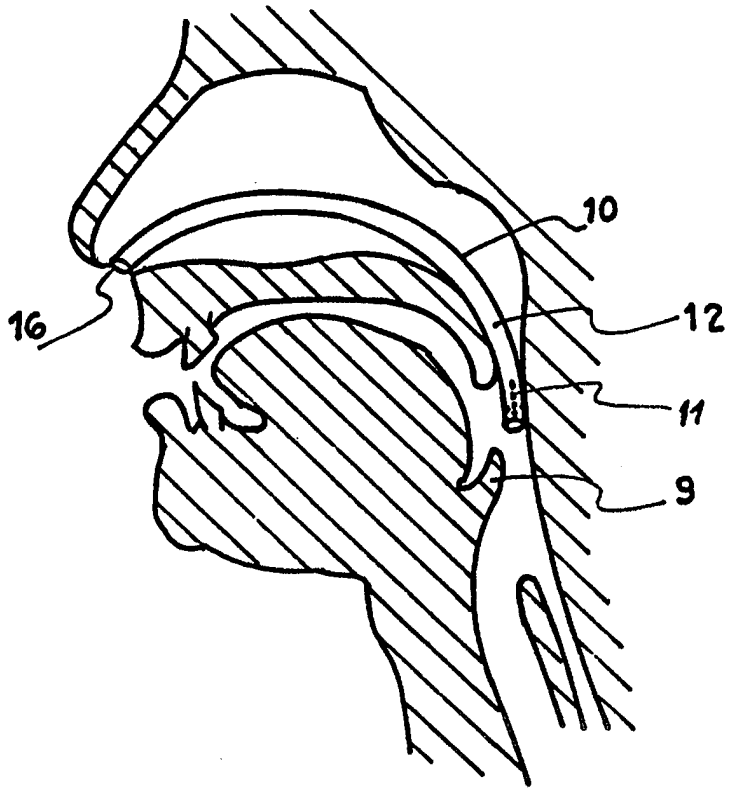
(54) Title: INTRANASAL SNORE PREVENTING DEVICE

(57) Abstract

The present invention relates to a device (10) for preventing snoring and sleep apnea. This device (10) comprises a pair of tubes (12, 12a, 12b, 14) of a diameter to permit their insertion through the nostrils (3) of a subject, and preferably of a length such that when so inserted the tubes' outer ends are located externally of the subject's nostrils (3) and the inner ends of the tubes (12, 12a, 12b, 14) extend through the nasopharynx region (2) to the oropharynx region (8). The outer ends of the tubes (12, 12a, 12b, 14) are joined by a bridge (16) limiting the inward movement of the tubes (12, 12a, 12b, 14). The inner end portion (17) has perforations (11) or grooves (15, 15a) running longitudinally along the sides of the tubes (12, 12a, 12b, 14), allowing the tubes' ends to cave in while swallowing. The inner end portion (17) contains a pair of opposite holes (13) for facilitating the air passage.



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INTRANASAL SNORE PREVENTING DEVICE

The present invention relates to a device and also to a method for preventing snoring and sleep apnea.

The principal causes for snoring and sleep apnea are decreased muscle tone of the soft palate and/or the descent of the base of the tongue. The former leads to dorsal movement of the soft palate, and each may result in obstruction of the air passage.

An object of the present invention is to provide a device of relatively simple construction which may be used for preventing snoring, and sleep apnea, and which may be applied whenever desired by the user, e.g., just before going to sleep. Another object of the invention is to provide a method of preventing snoring and sleep apnea using the novel device.

According to one aspect of the present invention, there is provided an intranasal snore preventing device comprising: a pair of tubes of a diameter to permit their insertion through the nostrils of a subject, and of a length such that when so inserted, one of the tube ends, constituting their outer ends, are located externally of the subject's nostrils and the opposite ends of the tubes, constituting their inner ends, extend through the nasopharynx region to the oropharynx region; the outer ends of the tubes being joined together by a bridge limiting the inward movement of the tubes to locate their inner ends in the oropharynx region; the tubes, except for such bridge,

being unconnected to any other device to provide an unobstructed airway from the atmosphere to the oropharynx region.

Preferably, the bridge limits the inward movement of the tubes such that their inner ends are located just above the epiglottis, to permit unrestricted swallowing.

The two tubes may further be different in diameter and of different lengths. According to an optional feature in the described embodiment, one tube is short and reaches below or is at the level of the soft palate, when inserted in one of the nostrils and the other tube is longer and is located just above the epiglottis.

Furthermore, one of the tubes may be much shorter than the other tube and may have a larger diameter than the other tube's diameter. The shorter tube does not have to extend further than the nostril's opening. Furthermore, the shorter tube may be so short as to consist of only a "ring" or even of part of a ring, namely an unclosed rounded half circle shaped piece. This shorter tube, or "ring", may have a diameter which is bigger than that of the nostril and may be squeezed while inserted in the nostril and expand when it is situated in the nostril, thereby widening the nostril's opening. Accordingly, only one tube is utilized for providing unobstructed airway to the oropharynx region, whereas the other tube acts as another means for increasing the airflow through the nostril, by widening the nostril's opening.

According to further preferred features in the described embodiment, the tubes are semi-rigid and elastic to permit them to conform to, and to retain themselves in, the shape of the nasopharynx and oropharynx regions of the subject when inserted therein.

According to further preferred features, the tubes inserted into the nasopharynx and oropharynx regions, contain on their inner ends, a longitudinally perforated part, or have a grooves running longitidinally along the sides of the tube,lending the tube an elasticity, allowing the tube's ends to cave in momentarily while swallowing and spring back to their regular diameter when the act of swallowing is over. For facilitating the air passage and for additional passage of air, the inner ends of these tubes may contain at least one pair of opposit openings (holes), larger than the holes on the perforated part of the tube, that are situated along side of the perforation or groove.

According to a further optional feature that may be included, the tubes and/or the bridge may be sufficiently springy, or include spring elements, to lightly bias them against each other behind the nasal septum.

According to another aspect of the invention, there is provided a method of preventing snoring in a subject comprising inserting the intranasal snore preventing device as described above through the nostrils of the subject such as to provide an unobstructed airway from the atmosphere to the oropharynx region, just above the epiglottis, of the subject while the subject is sleeping.

Further features and advantages of the invention will be apparent from the description below.

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

Fig. 1 is a diagram illustrating the nasopharynx region of a person;

Fig. 2 schematically illustrates the initial condition of one form of snore preventing device constructed in accordance with the present invention; and

Fig. 3 illustrates the device of Fig. 2 inserted into the nasopharynx region of the subject shown in Fig. 1 for preventing snoring.

For easier swallowing a portion of the inner end of tube is perforated 11 or has grooves.

Fig. 4 is an isometric view of one inserted tube whose inner end portion 17 is perforated 11 and which contains a pair of opposit holes 13 for facilitating the air passage and for additional passage of air.

Fig. 5 is a cross section of the inner end of an inserted tube of the device of the present invention having two opposit grooves 15 and 15a running longitidinally along the sides of the tube,for allowing the tube's ends to cave ineasily and momentarily while swallowing and spring back to their regular diameter when the act of swallowing is over.

Fig. 6 is an isometric view of the device of the present invention containing longitudinal grooves 15 along opposit sides of the tubes 12 and 14.

Fig 7. is an isometric view of the device of the present invention comprising one tube 12a shorter than the other 14.

Fig. 8 is an isometric view of the device of the present invention comprising one tube 14 long enough to reach below the soft plate, and one tube 12b is an unclosed rounded half circle shaped piece.

With reference to Fig. 1, there is diagrammatically illustrated the nasopharynx region, generally designated 2, of a person, including the nostrils 3, vestibule 4, hard palate 5, nasopharynx region 6, soft palate 7, oropharynx region 8, and epiglottis 9. The intranasal snore preventing device constructed in accordance with the present invention, generally designated 10 and particularly illustrated in Fig. 2, is adapted to be inserted through the nostrils of the subject into the oropharynx region so as to provide an unobstructed airway from the atmosphere to the oropharynx region, and thereby eliminate or substantially reduce snoring and sleep apnea.

Fig. 2 diagrammatically illustrates the construction of the intranasal snore preventing device 10. It includes a pair of tubes 12, 14 which are joined at their outer ends by a bridge 16, but are otherwise unattached to each other for their complete lengths. The two tubes 12, 14 are of a diameter to permit their insertion through the nostrils of the subject, and are of a length such that when so inserted, the outer ends of the tubes joined by bridge 16 are located externally of the person's nostrils to limit against the outer surface of the person's nose and to thereby locate the inner ends of the tubes in the oropharynx region of the subject, just above the epiglottis, as shown in Fig. 3. Except for bridge 16, the two tubes 12, 14, are unconnected to each other or to any other device to provide an unobstructed airway from the outside atmosphere to the oropharnyx region, while at the same time, they are pressed against each other just behind the nasal septum with the ends just above the epiglottis, thereby permitting swallowing while preventing outward movement of the device.

The two tubes 12, 14, are preferably made of a semi-rigid and elastic plastic material to permit them to conform to the shape of the nasopharynx and oropharynx regions of the subject when inserted therein, and to retain themselves in this shape. Preferably, they are formed with an initial curved or bowed configuration as illustrated in Fig. 2. The two tubes 12, 14, and/or the connecting bridge 16, may be sufficiently elastic or springy, or include

elastic or spring elements, to lightly bias the tubes against each other just behind the nasal septum, and thereby to restrain outward movement of the device when received through the subject's nostrils.

Fig. 4 is an isometric view of one inserted tube whose inner end portion 17 is perforated 11 and which contains a pair of opposit holes 13 for facilitating the air passage and for additional passage of air.

Fig. 5 is a cross section of an inserted tube of the device of the present invention having a groove 15 running longitidinally along the sides of the tube,for allowing the tube's ends to cave in momentarily while swallowing and spring back to their regular diameter when the act of swallowing is over.

Fig. 6 is an isometric view of the device of the present invention containing longitudinal grooves 15 along opposit sides of the tubes 12 and 14.

Fig 7. is an isometric view of the device of the present invention comprising one tube 12a shorter than the other 14.

Fig. 8 is an isometric view of the device of the present invention comprising one tube 14 long enough to reach below the soft plate, and one tube 12b is an unclosed rounded half circle shaped piece, which may have a diameter which is bigger than that of the nostril and may be squeezed while inserted in the nostril and expand when it is situated in the nostril, thereby widening the nostril's opening.

While the invention has been described with respect to one preferred embodiment, it will be appreciated that this is set forth merely for purposes of example, and that many other variations, modifications and applications of the invention may be made.

CLAIMS

1. An intranasal snore and sleep apnea preventing device, comprising;

a pair of tubes of a diameter to permit their insertion through the nostrils of a subject, and of a length such that when so inserted, one of the tube ends, constituting their outer ends, are located externally of the subject's nostrils and the opposite ends of the tubes, constituting their inner ends, extend through the nasopharynx region to the oropharynx region;

the outer ends of said tubes being joined together by a bridge limiting the inward movement of the tubes to locate their inner ends in said oropharynx region;

said tubes, except for such bridge, being unconnected to any other device to provide an unobstructed airway from the atmosphere to said oropharynx region.

2. The device according to Claim 1, wherein said bridge limits the inward movement of said tubes such that their inner ends are located just above the epiglottis to permit unrestricted swallowing.

3. The device according to the preceding claims wherein the inner ends of the inserted tubes are longitudinally perforated or have grooves running longitudinally along opposit sides of the tube's inner end to allow caving in of the tube's end while swallowing.

4. The device according to either of Claims 1,2or 3, wherein said tubes are semi-rigid and elastic to permit them to conform to, and to retain themselves in, the shape of the nasopharynx and oropharynx regions of the subject when inserted therein.

5. The device according to Claim 4, wherein said tubes have an initial curved or bowed configuration.

6. The device according to Claim 5 wherein said tubes are of different lengths, different diameters, different shapes or any combination of differnt tubes.

7. The device according to Claim 6 wherein one tube is long enough to reach below the soft plate when inserted in the nostril and the other tube is a rounded circlar shaped, closed or partially closed ring.

8. The device according to Claim 7 wherein the rounded circlar shaped, closed or partially closed ring are of a diameter which is bigger than that of the nostril and are squeezed while being inserted in the nostril and expand when they are situated in the nostril, for widening the nostril's opening.

9. The device according to the preceding claims wherein the inner ends of the inserted tubes contain at least one pair of opposit openings that are larger than the holes on the perforated part of the tube, and that are situated along side of the perforation or groove, for facilitating the air passage and for additional passage of air.

10. The device according to the preceding claims wherein said tubes and the connecting bridge are sufficiently springy, or include spring elements, to lightly bias them against each other just behind the nasal septum when inserted through the subject's nostrils.

11. A method for preventing snoring and sleep apnea in a subject comprising inserting the device according to he preceding claims through the nostril of the subject such as to provide an unobstructed airway from the atmosphere to the oropharynx region, just above the epiglottis or at the level of the soft palate, of the subject just before going to sleep.

12. The intranasal device according to the preceding claims, substantially as described with reference to and as illustrated in the accompanying drawings.

13. A method of preventing snoring and sleep apnea in a subject according to the preceding claims, substantially as described with reference to and as illustrated in the accompanying drawings.

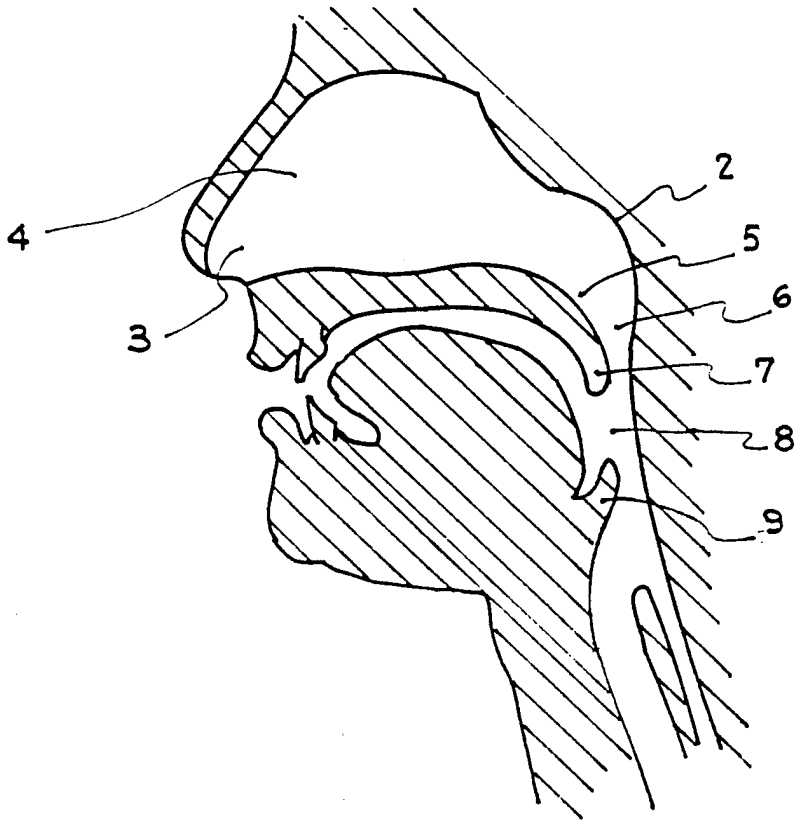

FIG 1

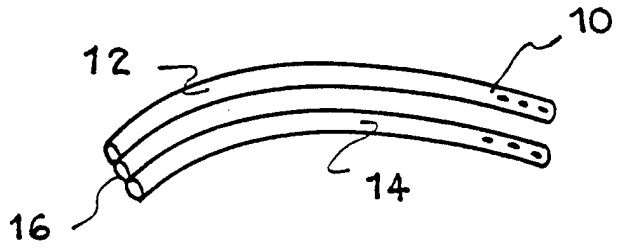

FIG 2

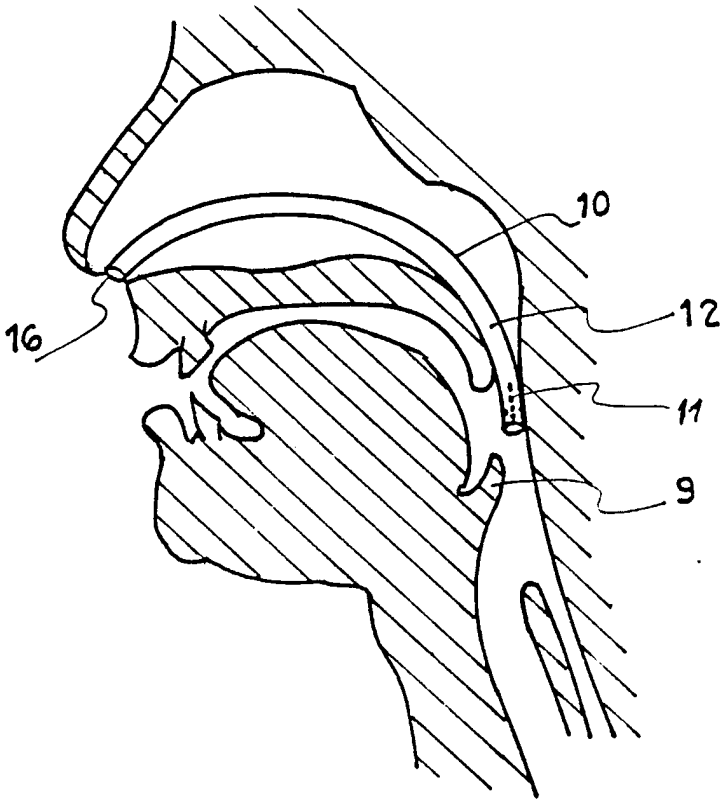

FIG 3

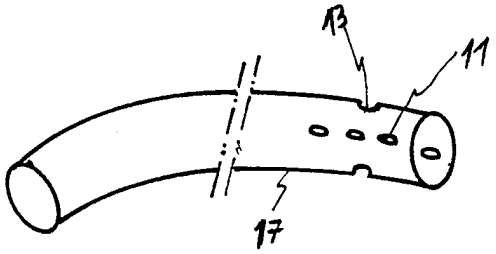

FIG 4

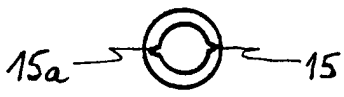

FIG 5

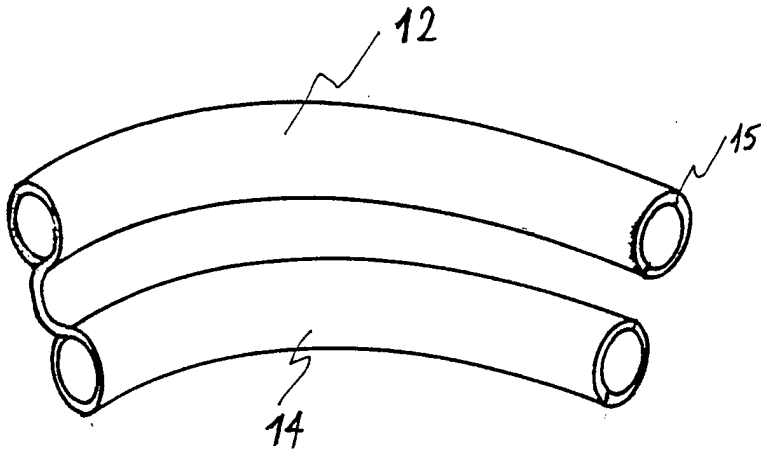

FIG 6

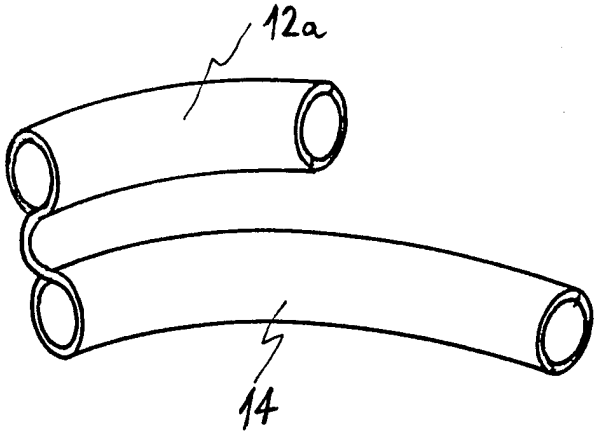

FIG 7

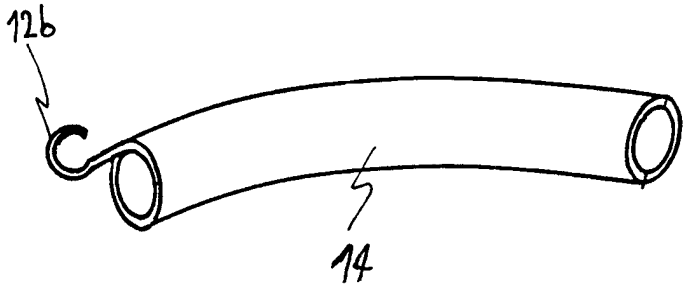

FIG 8

INTERNATIONAL SEARCH REPORT

Interna al Application No
PCT/IL 97/00387

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61F5/56

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 935 859 A (DOYLE) 3 February 1976 see column 2, line 20 - column 3, line 2; figures 1-3	1,2,4,5
X Y	DE 296 16 121 U (BARELMANN) 31 October 1996 see page 4, line 13 - page 5, line 7; figures 1,2	1 2
X	CH 477 874 A (LEUENBERGER) 15 September 1969 see the whole document	1
A Y	DE 10 57 738 B (SAUTER) 21 May 1959 see column 2, line 33 - column 3, line 30; figures 1,2	1,10 2

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
17 March 1998	25.03.98

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Internal Application No
PCT/IL 97/00387

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 1 402 857 A (BOUET) 29 October 1965 see page 2, left-hand column, line 2 - line 26; figures 1,2,4	1,4,5,7, 8
A	FR 2 610 830 A (CAPLEG) 19 August 1988 see page 4, line 20 - page 5, line 11; figure 3 see page 6, line 11 - line 24	1,4,7,8
A	WO 96 29034 A (EDMARK) 26 September 1996 see page 4, line 10 - line 26 see page 6, line 1 - line 12; figures 4,5 see page 6, line 21 - page 7, line 6; figure 6	1,3,4,6, 9
A	US 1 672 591 A (WELLS) 5 June 1928 see line 16 - line 69; figures 1-3	1,10
A	US 4 781 186 A (SIMPSON ET AL) 1 November 1988 see column 4, line 24 - column 5, line 2; figures 2,3,5	3

3

INTERNATIONAL SEARCH REPORT

Ir. ational application No.
PCT/IL 97/00387

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.: 11,13
because they relate to subject matter not required to be searched by this Authority, namely:

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

2. [X] Claims Nos.: 12,13
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

Rule 6.2 (a) PCT - Claim should not contain references to the description or to the drawings

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Interna l Application No
PCT/IL 97/00387

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